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TITLE: Radiant gas burner with cylindrical body - has  
perforations and helically wound metal coil

PATENT-ASSIGNEE: SHELL INT RES MIJ BV[SHEL]

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ABSTRACTED-PUB-NO: GB 1426123A

BASIC-ABSTRACT:

The burner body may be a cylinder of metal gauze or perforated sheet, its openings (2) forming flame ports to which gas-air mixture may be fed through a perforated conical flow-distributing baffle in one end of the body. Helically wound around the body is a metal coil, suitably a "coiled coil" of heat resisting wire which quickly become incandescent and may be retained with the aid of another wire threaded through it. Alternatively the coil may be wound from flat strip edge-on to the burner body. The burner may be used for heaters, grills or camping stoves.

TITLE-TERMS: RADIANT GAS BURNER CYLINDER BODY PERFORATION  
HELICAL WOUND METAL  
COIL

DERWENT-CLASS: Q73

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 (72) Inventors GUY LAMOUREUX and THIERRY JAMET



## (54) RADIANT GAS BURNER

(71) We, SHELL INTERNATIONALE RE-  
 SEARCH MAATSCHAPPIJ B.V., a company or-  
 ganised under the laws of The Nether-  
 lands, of 30 Carel van Bylandtlaan, The  
 Hague, The Netherlands, do hereby declare  
 the invention, for which we pray that a  
 patent may be granted to us, and the method  
 by which it is to be performed, to be par-  
 ticularly described in and by the following  
 statement:—

The present invention is concerned with a  
 radiant gas burner.

There has been need for a radiant gas  
 burner of simple and economic design which  
 has desirable characteristics in regard to  
 thermal inertia, radiant surface area and the  
 ability to provide hygienic combustion, and  
 which is particularly suitable for fitting to  
 heaters, grills and camping stoves.

According to the present invention a  
 radiant gas burner comprises a hollow body  
 perforated by a multiplicity of orifices which  
 provide flame ports for a fuel gas/air mix-  
 ture supplied to the interior of said body,  
 said body carrying on its exterior surface a  
 plurality of spaced-apart turns of metal radi-  
 ant means helically wound on said body in  
 such a manner that said orifices in said body  
 open into the spaces between adjacent turns,  
 and means for supplying a fuel gas/air mix-  
 ture to the interior of said body.

The body of said burner can be, for ex-  
 ample, in the form of a cylindrical sleeve,  
 and it can be made, for example, from metal  
 gauze or perforated metal sheet or from a  
 mass of porous ceramic material. The  
 helically wound radiant means can consist  
 of a helical coil of steel or refractory metal  
 alloy wire, which coil is itself helically  
 wound round said body to form a coiled-  
 coil thereon. Alternatively, the helically  
 wound radiant means can consist of steel or  
 refractory metal alloy flat strip disposed  
 round said body with the flat surfaces there-  
 of lying in planes normal or approximately  
 normal to the exterior surface of said body.

The present invention will be described  
 with reference to the accompanying drawing,  
 in which:

Fig. 1 represents, partly in elevation and  
 partly in axial cross-section, an embodiment  
 of gas burner according to the present in-  
 vention, and

Fig. 2 illustrates on a larger scale the  
 detail contained in circle II of Fig. 1.

The gas burner shown in Fig. 1 comprises  
 a hollow body 1 with a cylindrical wall per-  
 forated by a multiplicity of uniformly dis-  
 tributed orifices 2 through which a fuel gas/  
 air mixture introduced at the base of the  
 hollow body 1 escapes radially towards the  
 exterior. These orifices 2 constitute flame  
 ports for the air/gas mixture. The hollow  
 body 1, of which the wall can alternatively  
 be in the shape of, for example, a truncated  
 cone, a prism or a hemisphere, can be  
 economically manufactured from metal  
 gauze or perforated metal sheet, which is  
 rolled into the desired shape and held in  
 that shape by any convenient means. Alter-  
 natively, the body 1 can be manufactured  
 from a mass of ceramic material, for ex-  
 ample, of a porosity which provides the re-  
 quired multiplicity of orifices in the wall of  
 the body. The upper end of the body 1 is  
 closed by a blank metal disc 3. The dimen-  
 sions of the orifices 2 are so chosen that the  
 flame-arresting effect prevents combustion  
 occurring upstream of the wall of the hollow  
 body 1. Within the body 1 at the base  
 thereof is a distribution device consisting of  
 a cone 4 perforated by a multiplicity of  
 orifices through which the gas/air mixture  
 is admitted into the interior 5 of the body  
 1. This feature makes it possible to obtain  
 flames of substantially identical shape and  
 dimensions over the exterior surface of the  
 body 1. The ratio of air available to the  
 gas/air mixture issuing from the orifices 2  
 to the total air can readily be determined in  
 order to ensure hygienic combustion.

The body 1 carries on its exterior surface  
 a coiled-coil type of radiant member which  
 comprises a coil of wire 6 of steel or re-  
 fractory metal alloy, the coil being itself  
 coiled helically round the body 1. As shown  
 by the enlarged detail in Fig. 2, the wire  
 coil 6 is formed into a succession of coils

of diameter  $d$  and winding pitch  $p$  which are directly subjected to the action of the flames 7 of the burner. The retention of the wire coil 6 on the body 1 can be improved by the presence of a reinforcing wire 8 of a refractory metal of low coefficient of thermal expansion. In operation of the burner the wire coil 6 is brought rapidly to incandescence; it has a low thermal inertia by virtue of the use of wire in helical coil form. Because of the multiplicity of coils of which it is made, a large radiant surface area is quickly brought to a practically uniform temperature.

The radiant surface area of such a gas burner according to the invention can be increased by substituting for the blank disc 3 which closes the upper end of the body 1 a plate which is itself perforated with a multiplicity of orifices through which the gas/air mixture can escape to the exterior. The flames formed on this perforated plate are utilized to bring to incandescence a disc (not shown) of steel or refractory metal alloy fixed adjacent to but spaced from the perforated plate, the disc forming a part of the total radiant surface of the burner.

#### WHAT WE CLAIM IS:—

1. A radiant gas burner comprising a hollow body perforated by a multiplicity of orifices which provide flame ports for a fuel gas/air mixture supplied, to the interior of said body, said body carrying on its exterior surface a plurality of spaced-apart turns of metal radiant means helically wound on said body in such a manner that said orifices in said body open into the spaces between adjacent turns, and means for supplying a fuel gas/air mixture to the interior of said body.

2. A gas burner as claimed in claim 1, wherein said body is in the form of a cylindrical sleeve.

3. A gas burner as claimed in claim 1 or claim 2, wherein said body is formed from

metal gauze or from a perforated metal sheet.

4. A gas burner as claimed in claim 1 or claim 2, wherein said body is formed from a mass of porous ceramic material.

5. A gas burner as claimed in any one of claims 1—4, wherein said helically-wound metal radiant means consists of a helical coil of steel or refractory metal alloy wire, which coil is helically wound round said body to form a coiled-coil thereon.

6. A gas burner as claimed in any one of claims 1—4, wherein said helically-wound metal radiant means consists of steel or refractory metal alloy flat strip disposed round said body with the flat surfaces thereof lying in planes normal or approximately normal to the exterior surface of said body.

7. A gas burner as claimed in any one of claims 1—6, wherein said body is of elongated form and has an inlet for a fuel gas/air mixture at one end, the other end being closed by a plate perforated by a multiplicity of orifices constituting additional flame ports for said mixture, and a disc of steel or refractory metal alloy is provided as additional radiant means, said disc being disposed adjacent to but spaced from the exterior surface of the perforated plate.

8. A gas burner as claimed in any one of claims 1—7, wherein said means for supplying a fuel gas/air mixture to the interior of said body comprises a cone perforated by a multiplicity of orifices, which cone is disposed within said body for distributing the fuel gas/air mixture within the interior thereof.

9. A gas burner substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawing.

R. C. ROGERS,  
Chartered Patent Agent,  
Shell Centre,  
London, SE1 7NA.  
Agent for the Applicants.

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